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20 December 1966

DEVELOPMENT OBJECTIVES

MATERIALS HANDLING STUDY (Non-Digitally Stored Data)

1. Introduction. This document comprises the background, concept, and requirements of a Government sponsored program to improve the handling and storage of non-digital information and material (i.e., that not practical for computer storage). However, indexes to this information and material will be maintained in an existing computer complex.

2. Background. In the imagery exploitation process the two major ingredients supplied to the photo interpreter are the imagery (photography and other image forming sensors), and collateral material (maps, magazines, ground photography, reports, etc.). There are several million square feet of imagery and millions of pages of collateral information stored and utilized at NPIC. The input of both classes of material is increasing at an alarming rate. The basic problem is to store, retrieve, reproduce, control, and transport these materials on a timely basis. The ultimate objective is to deliver the necessary information to the user in the shortest practical time and most efficient manner. The contractor is to study all of the aspects of film and collateral material handling and storage and will be free to suggest any techniques and/or equipment that will resolve the problem areas. Some in-house study has already been performed, and the following information provides further background and briefly describes some of the conceptions of the study.

2.1 Imagery Use. Essentially, there are two ways of handling film at NPIC--in roll form or cut pieces commonly called "chips". When new film first arrives at NPIC, it is in roll form and many personnel have an immediate need for it. Even though there may be as many as seven copies of each roll, the demand for certain rolls may exceed the supply, particularly when there are several different targets on the same roll. On the other hand, there may be no demand for any of the seven copies of another roll since it does not contain any imagery requiring immediate interpretation. This led to the concept of a "chip" system where small rectangular pieces of film would be reproduced from the rolls. Under this system those areas which are in immediate demand by the photo interpreters would be located and reproduced in multiple copies. Less than one per cent of the total film coverage might need to be duplicated in this manner. There are techniques that have been developed which would assist in automatically selecting the desired areas to be duplicated. This concept has not been formally implemented to date, although most photo interpreters have been cutting out their own chips. The size of the chips varies from 2" x 2" upwards and are mounted in a variety of ways. Advantages of such chips are: the fact that a whole roll of film is not tied

GROUP 1
Excluded from automatic downgrading and declassification

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up while interpreting one target, convenience of handling, convenience in attaining stereo coverage, ease of maintaining a personal working file, mobility in moving the imagery from one viewing instrument to another, and the use of more convenient, simpler, and higher quality optical instruments than are presently available for viewing roll film. It is important that all the many ramifications of this concept be considered during the study--leading to validation or rejection of such a system.

2.2 Imagery Storage and Transportation. Over 50,000 rolls of film are presently available at NPIC. Each roll contains an average of 200 linear feet of film and is stored in a cylindrical container. This material occupies 9000 square feet of floor space in a film library. The study must include the problem of storage and the transportation of imagery materials, in line with the concept developed for their use, from a central location to various offices in this multi-story building. This is a problem of immediate concern, and it may be appropriate to suggest an interim solution. The system must include provisions to control and record the location of the film at all times. The same system could possibly be used for transporting collateral materials.

2.3 Collateral Material. For the purpose of this document, collateral material is defined as any information used in the imagery exploitation process that is not considered under imagery. Any information stored in a computer is excluded from this study. Presently at NPIC there are an estimated 1,250,000 maps and charts, 75,000 reports, 20,000 books and magazines, 150,000 photographs and 75,000 miscellaneous indexed files. The type of photographs considered under collateral material are usually ground photos or reproductions from magazines or books, and consequently, they are of lower resolution and quality than reconnaissance imagery. The volume of the stored material may possibly be decreased by photographic reduction techniques such as microfilm, microfiche, etc. Consideration must be given to the handling of colored maps and photography. Some of the techniques developed for handling imagery could possibly also be applied to handling collateral material. Closed circuit TV may also be considered as a means of transporting information from one location to another.

3. Purpose. The planned program will encompass the identified problem areas and suggest additional problem areas through the investigation and analysis of current procedures, detailed recommendations for possible alternative solutions, and the establishment of practical and feasible current and future automation levels. Ultimately, the results of these studies will be used to develop and install appropriate procedures and equipment to minimize the problems in handling of information and data.

3.1 Scope. The total program, as envisioned, will be divided into the following three separate but interrelated phases. Proposals

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solicited hereunder are to be restricted to the tasks outlined in Phase I (Paragraph 3.1.1) and Phase II (Paragraph 3.1.2). Phase III (Paragraph 3.1.3) is included as a matter of information and as an aid in developing the material required under Phases I and II.

3.1.1 Phase I, Investigation and Analysis. The contractor will thoroughly investigate, review, and analyze current procedures for handling the various forms of material and data within NPIC; determine the requirements for such material and data in terms of quality, volume, flow, response time, search strategy, etc.; generate alternative conceptual plans for systems to satisfy these requirements; and evaluate the alternatives in accordance with the criteria outlined in Paragraph 4.1.1.

3.1.1.1 The conceptual plans should include recommended solutions to the material and data handling requirements identified during the investigation, and as a minimum must consider the following problem areas:

a. The advisability of using cut film or "chips" in conjunction with, or in lieu of, roll film considering methods for storing, retrieving, reproducing, and controlling the imagery materials.

b. Methods for improving access to, storing, retrieving, reproducing, controlling, and updating imagery derived from previous coverage, irrespective of sensor.

c. Means of improving access to, storing, retrieving, reproducing, controlling, and updating textual data.

d. Methods for storing, retrieving, and displaying maps, charts, plots, etc.

e. Methods for automatically transporting the various forms of material or the information contained therein from one location to another within the building.

3.1.2 Phase II, System and Equipment Definition. Based on the conceptual plan resulting from the Study in Phase I, alternate techniques for implementation of the conceptual design will be developed and evaluated. The report on this phase will include a thorough analysis and comparison of all alternatives considered. The report will be both quantitative and qualitative in measuring one proposed alternative against the other and in demonstrating the amount of improvement each alternative could achieve over the present system. A detailed system plan based on the selected alternative should be prepared and should include system and equipment parameters, implementation time, impact on the operational components of the Center, personnel and personnel

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training requirements, and the estimated costs of the proposed system for development, installation, and operation. It is possible that because of the large differences in types of materials to be handled that the system may consist of a number of sub-systems. It is also possible that one system may be incorporated to provide an early solution to present problems while a second system may be contemplated for long term future needs. If more than one system is suggested the contractor must clearly distinguish the role and function of each system or subsystem, evaluate each separately and clearly, and demonstrate their integration as appropriate.

3.1.3 Phase III, Equipment Development, Acquisition and Installation. Utilizing the specifications generated under Phase II, it is the intent of the Government to solicit proposals for a modern materials and data handling system. Proposals will include equipment modification, development, phase-in, installation, check-out, and training of personnel. It should be reiterated that Phase III is discussed here for information and guidance only and is not to be included in the proposal.

4. Requirements.

4.1 Phase I Objectives. Two major reports stemming from the Investigation and Analysis Phase (Paragraph 3.1.1) are to be delivered. The first report is to cover the contractor's analysis of NPIC processes and the identification of requirements for information utilized by NPIC, which will not be handled in the digital system. The second report is to present the alternate conceptual designs generated by the contractor to meet the identified requirements.

4.1.1 In developing the alternative conceptual designs the following criteria will be utilized for evaluation purposes. Current procedures should also be evaluated, utilizing these criteria, so that judgment can be made as to the amount of improvement the implementation of the proposed concepts are designed to achieve.

(a) Form and Organization of Information. A measure of how adequately the form, organization, and content of the information agrees with that required by the users for optimum performance of their functions.

(b) System Performance. Time from receipt of information into the system until it is available to a user and length of the time from query to response.

(c) Reliability. Consistency of expected performance and ability of system to perform major functions in event of individual component failure.

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(d) Ease of Phase In. An indication of the amount of disruption of Center activities during implementation of the system.

(e) Expansibility. Difficulty (time and cost) of adding to the system to meet increased demands.

(f) Flexibility. Ability of system to handle new or unexpected demands.

(g) Compatibility. A measure of the ability of the system to function harmoniously with the automated and non-automated systems within and external to the Center.

(h) Facility Requirements. The need for unusual site preparation, utilities, communication circuits, etc.

(i) Personnel Requirements. The number and skill types required for system operation.

(j) Total System Cost. This includes all initial and operational costs. Initial implementation costs should be separated from the predicted annual operating costs.

4.2 Phase II Objectives. Three reports are to be delivered under the System and Equipment Definition Phase (Paragraph 3.1.2). The first report covering item (a) below, will include the comparison of alternates mentioned in Paragraph 3.1.2 and will utilize the same criteria (Paragraph 4.1.1) for comparison specified for the concepts in Phase I. The second report covering item (b) below will be such that it is suitable for use on a basis of a request for a proposal directed toward Phase III (Paragraph 3.1.3) without extensive rewrite or modification. The third report will cover item (c) below.

(a) Development and evaluation of alternate methods for accomplishing the functions of the system defined by the conceptual design resulting from Phase I. Alternate methods for accomplishing the major subsystem tasks will be evaluated and reported upon, as well as alternates for accomplishing the overall system functions.

(b) Establishment of a detailed system configuration, including overall operation, description and detailed specifications of system components, and component interfaces. Detailed specifications should be divided into logical subsets to permit use of multiple sources of procurement for Phase III.

(c) Preparation of a detailed implementation plan (PERT) for the system. Budgetary costs and schedules for procurement and installation of equipment, facilities preparation, system testing, and personnel training should be included.

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5. General

5.1 Computer Interface. Inasmuch as NPIC operates a central computer system, it is mandatory that all listing, indexing, and control functions to be performed under the proposed plan be compatible with the existing computers.

5.2 Proposals. The proposals should be comprehensive, well organized, clear, concise, and limited in content to that information required to qualify the prospective bidder and demonstrate ability to perform satisfactorily within the scope of this document. The format of the proposal should be arranged to separate company and personnel qualification sheets from the main body of the proposal.

5.2.1 Delivery. While it is the wish of the Government to accomplish the aims of this program as expeditiously as possible, sufficient time should be allotted for a thorough and complete accomplishment of the aims set forth herein. Tentatively it is envisioned that the following time spans will be allotted to the various phases.

Phase I - Six months (Report covering NPIC analysis to be delivered after 3 months. See Paragraph 4.1.)
Phase II - Six months to twelve months

5.2.1.1 Adequate time (approximately four weeks) shall be allowed for Government review and checking following the issuance of each report (both interim and final), required under this program since in each case the content of the reports will form the basis for subsequent work.

5.2.1.2 As a result of Government review, a limited amount of revision and rewrite may be required. Proposals submitted hereunder should include provisions for this contingency.

5.2.2 Costing. Cost proposals should be presented in such a manner that the cost of Phase I can be readily separated from the cost of Phase II.

5.3 Program Interface. Although the work to be performed under the terms of this document is confined to the development of a non-digital material handling system, interfaces will exist between this program and other studies underway within NPIC. It is anticipated that liaison between the contractor selected for this program and the contractors conducting related internal studies will be such that this program will result in a compatible and integrated system.

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5.4 Administration. The Government will retain overall control of this program. Written approval from the contracting officer must be obtained before any changes in objectives, costs, or priorities are effected or before any subcontractor or consultant is employed.

5.5 Contractor Responsibility. The contractor is expected to provide competent and cooperative administrative service. He will be vested with certain authority to control the direction and degree of technical effort within the bounds of the estimated costs. As a part of his overall responsibility, the contractor will be responsible for the work performed by all of his subcontractors and consultants. The fact that the Government has granted approval of the use of a specific subcontractor or consultant (See Paragraph 5.4) in no way relieves the contractor from this responsibility.

5.6 Technical Representatives. The contracting officer will designate a technical representative to authorize specific development efforts of the contractor. Such authorization shall be given in writing in its original form or in confirmation of an oral authorization. The contractor will accept no other authorization except that of the technical representative or contracting officer.

5.7 Reports. Regular reports will be required throughout the life of the contract. All reports will meet the basic requirements of specification DB-1001, dated 31 August 1966, GENERAL REQUIREMENTS FOR CONTRACTUAL DOCUMENTATION, attached hereto.

5.7.1 Monthly Progress Reports covering each specified phase or subphase of this program will be submitted.

5.7.2 Final Reports will be submitted as indicated and will contain the information described under each Phase of this program.

5.7.3 Detailed Specifications submitted under Phase II will conform to documentation standards mutually agreed upon by the Technical Representative and the Contractor.

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